

# Human Capital, Intergenerational Mobility, and Inequality\*

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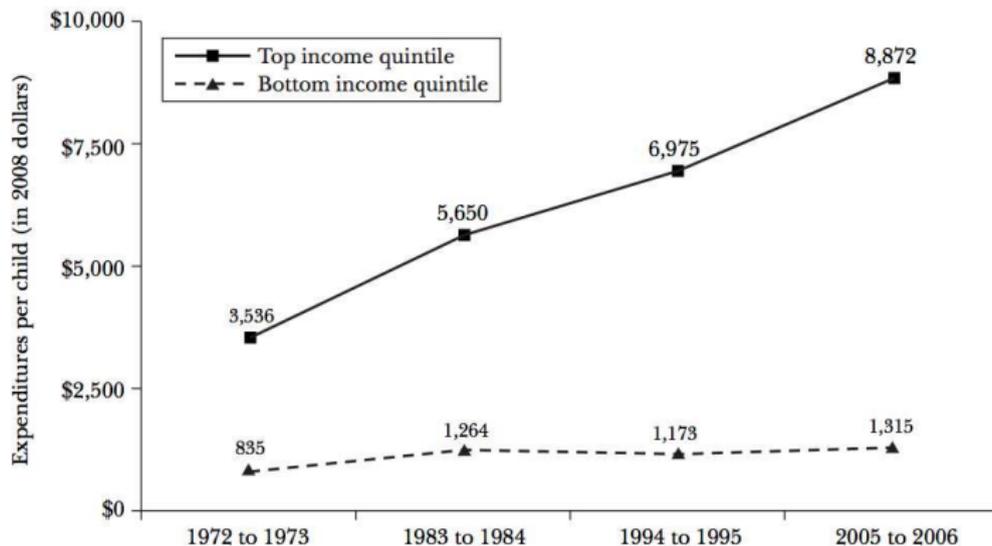
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\*Assistance of Nolan Pope

- 1 Importance of the properties of the production function for children's human capital, especially the interaction of parental spending with parental human capital.
- 2 Role of parents through investment in children, nurturing, etc.
- 3 Government spending on children.
- 4 Nature of parental utility function (e.g. how much they care about their child).
- 5 Transmission from human capital to earnings.

# Family Enrichment Expenditures

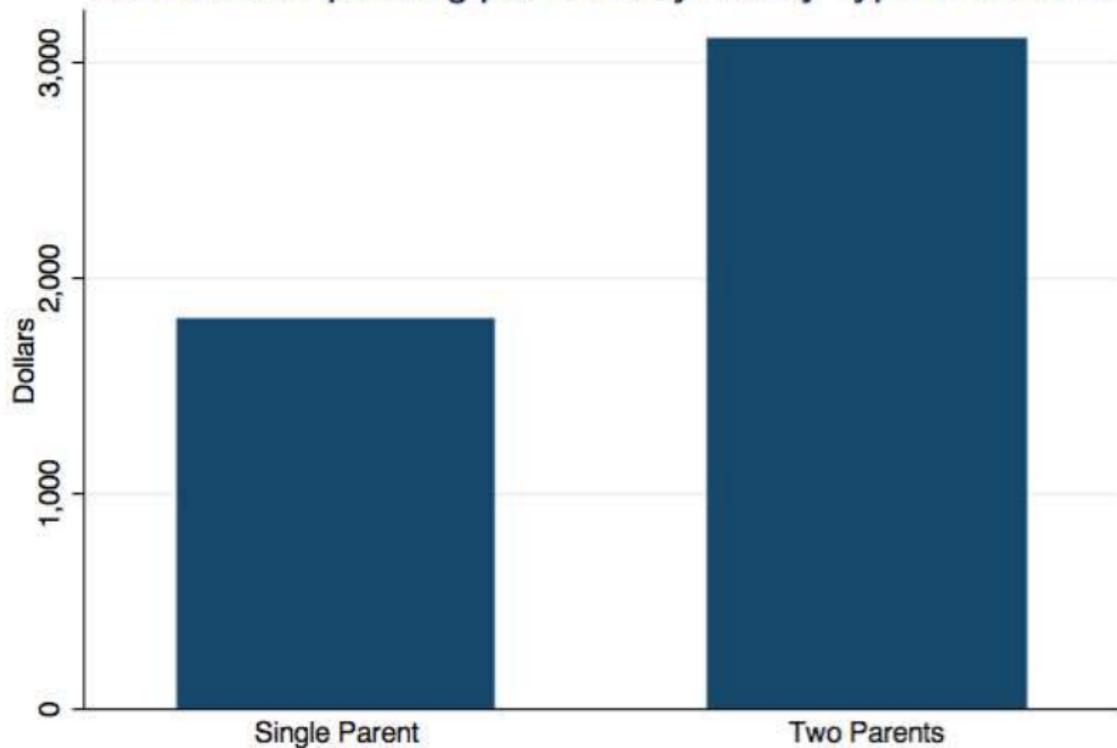
## Money Matters: Higher-Income Families in the United States Have Higher Enrichment Expenditures on Their Children



Spread perhaps because of higher return to college education.

# Family Type

Enrichment Spending per Child by Family Type in the U.S.



# Substitutes

- 1 If government spending is a close substitute for private spending (books, supplies, food), greater government spending reduces private spending.
  - This is the usual case analyzed.
  - If government spends a lot, private spending is reduced to little or zero.
- 2 However, if government spending is a complement to private spending, greater government spending induces greater private spending (homework, quality of teachers, etc.).
  - Government spending has multiplier effect on children's human capital.

Complementarity between government spending and private investment also implies that equal government spending on children in different families is not “neutral,” because it has a bigger impact on families with greater parental human capital.

- Why?

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- Why?

The reason is that higher human capital families spend more on children so there is a bigger effect in these families of greater or increased government spending.

# Neutral Government Spending

- To just be “neutral,” government spending on education has to sufficiently favor children who are disadvantaged.
- But a disturbing feature of this is that productivity on children’s human capital by any given level of government spending would be greater in more educated families than in disadvantaged ones because more educated families invest more in children.

# Capital Constraints

- If there are capital constraints on spending for lower income families, governments that give money to the poor may have high returns, and reduce inequality.
- This could be true even if poorer families spend some of the government money on themselves and older children.

# Equity vs Efficiency

- What is the trade off between the effectiveness of government investment in children and “equity” of these investments?
- Even if poorer families are underinvesting in children’s human capital because of capital constraints, it could be less productive for governments to invest more on their children’s human capital.
- But more government investment on poorer children would raise intergenerational mobility by improving opportunities for lower income families.

# Human Capital Production Function

$$H_c = a + hH_p + cH_p^2 + v_c$$

$H_c$  = Human capital of children

$H_p$  = Human capital of parents

$v$  = Shocks and other determinants such as government spending or ability of child

# The Coefficient $h$

The coefficient  $h$  is usually emphasized.

*It is greater when:*

- ① *Interaction between private spending and  $H_p$  is greater.*
- ② *Interaction between private spending and government spending is greater.*
- ③ *Direct effect of private spending is greater.*

*It is lower when:*

- ① *Diminishing returns to parental spending.*
- ② *Direct effect of government spending on  $H_c$  is smaller.*
- ③ *Negative covariance of government spending with  $H_p$ .*

# Non-linear Effects of $H_p$

Little attention is paid to non-linear effects of  $H_p$ , but theory predicts  $c > 0$ , so that the relation is convex.

- Why this prediction?

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- Why this prediction?

The interaction discussed earlier. Higher  $H_p$  directly raises  $H_c$ , but it also raises private spending which increases the effect of a larger  $H_p$ .

# Transmission Mechanism

The transmission mechanism being convex is not just a technical relation. It has important implications about intergenerational mobility.

- It implies mobility towards the mean is great at lower end than at middle or high end of parental  $H_p$  distribution.
- More persistence in status at upper end than in middle or lower end.
- Less turnover of elites than at lower end.
- Indeed, different ends of the distribution could be converging towards different levels (e.g. small negative cubic term on  $H_p$ ).

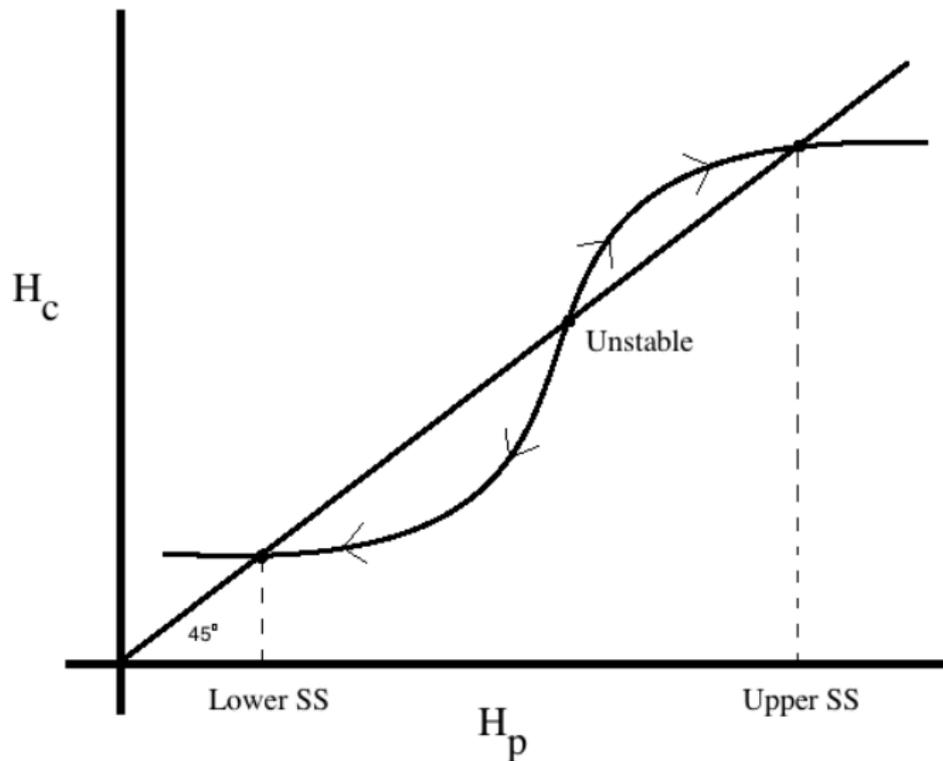
# Evidence From China

The estimated intergenerational income elasticity for lower vs upper 50% of income distribution in China.

	Lower 50%	Upper 50%	Difference
Early Birth Cohort	0.215* (0.123)	0.445*** (0.103)	0.230 (0.154)
Later Birth Cohort	0.331*** (0.084)	0.518*** (0.083)	0.187* (0.113)
Difference	0.116 (0.147)	0.073 (0.133)	

# Multiple Steady States

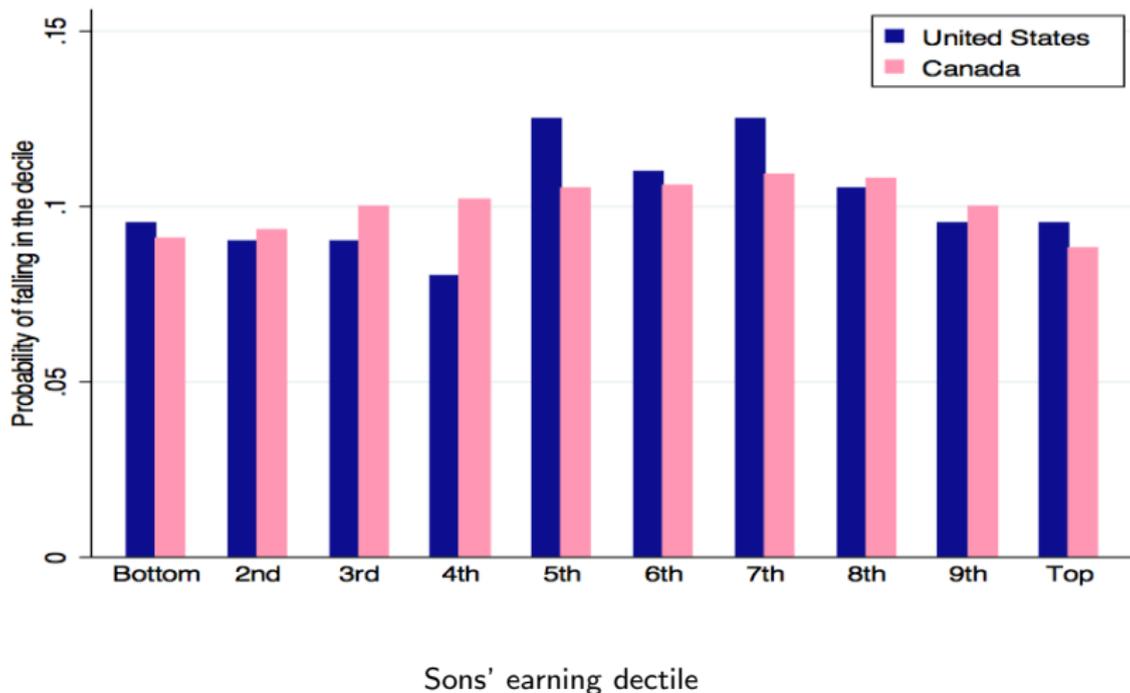
In this graph there are two stable steady states, high and low.



- 1 Children of low  $H_p$  tend to stay low, but very good shocks in ability, etc., could push them toward the higher steady state.
- 2 Conversely for children of high  $H_p$ , very bad shocks could push them towards the lower steady state.
- 3 “Middle classes” have greater mobility. They tend to get pushed toward the higher or lower steady state.
- 4 Greater stability at high and low ends of the distribution is consistent with some data, although not investigated very much empirically.

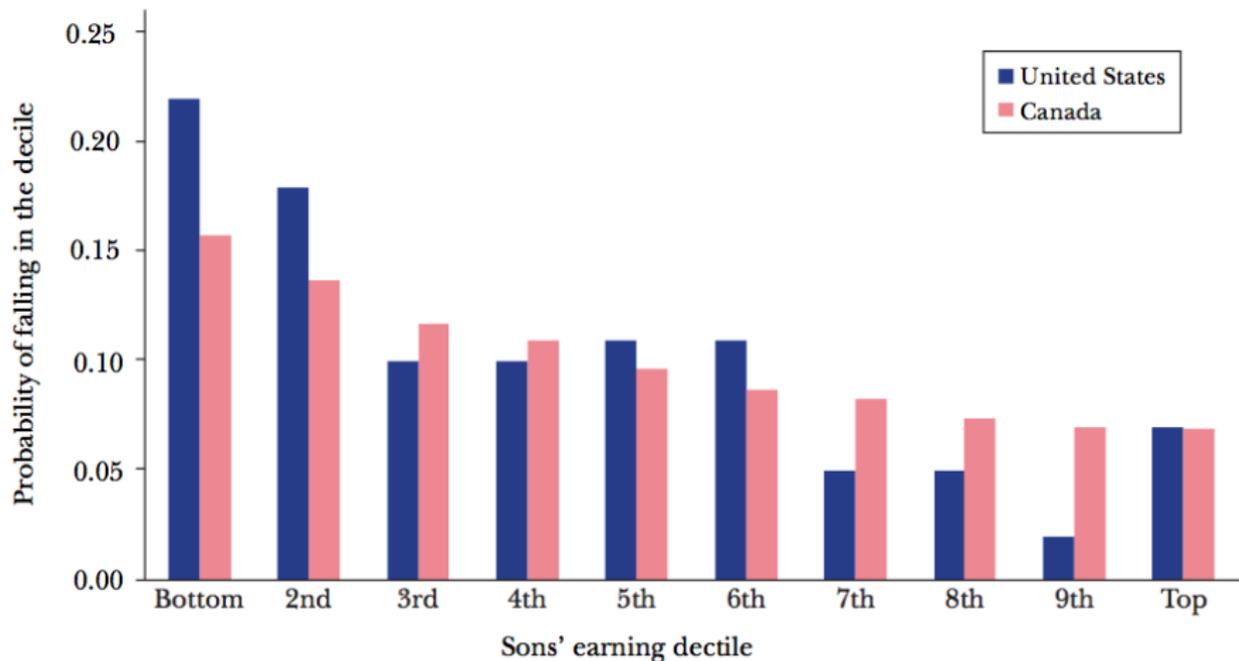
# Canada vs US: Middle Two Deciles

Earnings Decile of Sons Born to Middle Two Decile Fathers: United States and Canada



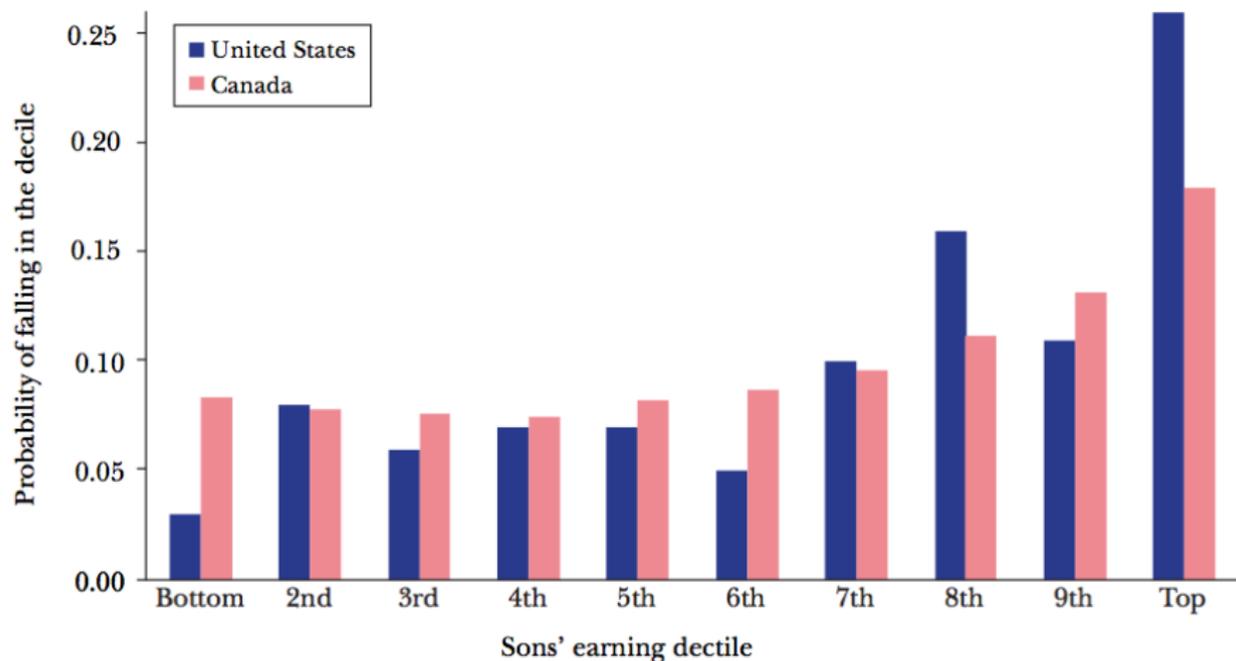
# Canada vs US: Bottom Decile

## Earnings Deciles of Sons Born to Bottom Decile Fathers: United States and Canada



# Canada vs US: Top Decile

## Earnings Deciles of Sons Born to Top Decile Fathers: United States and Canada



# Earnings Inequality

Can transmit from human capital to earnings with a simple model.

$$E = rH + u$$

$E$  = Earnings

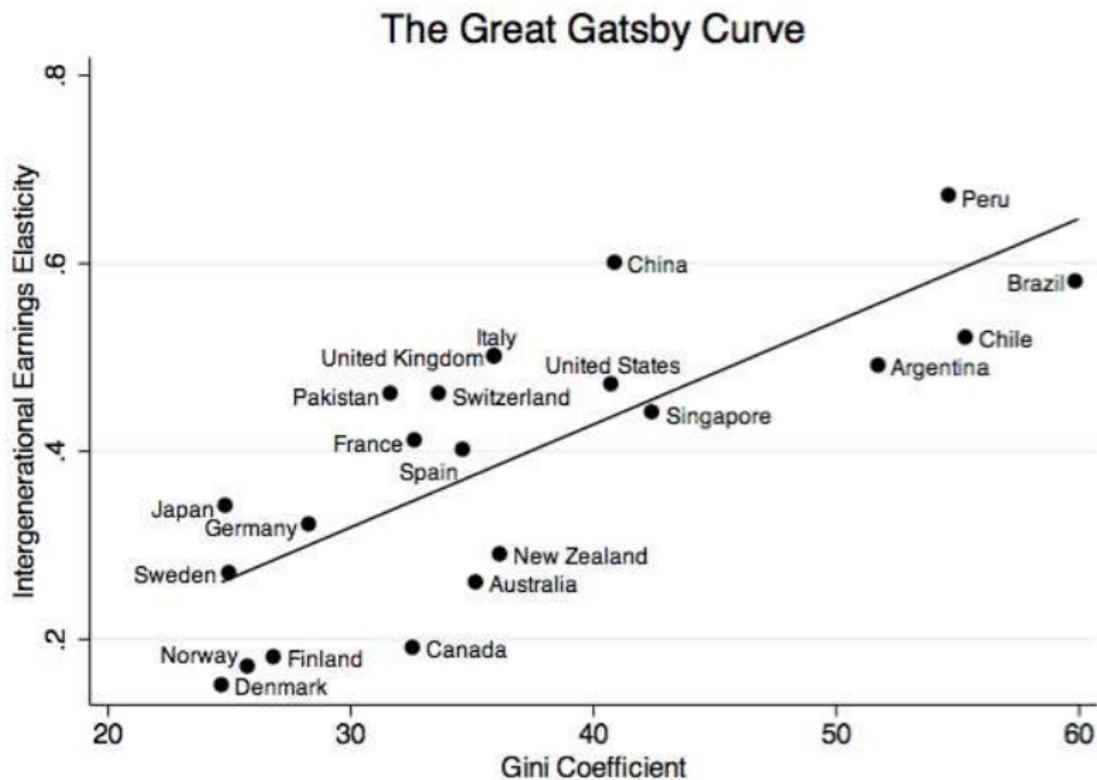
$r$  = Return to a unit of human capital

$u$  = Other determinants of earnings: unions, regulations, and shocks to firms, industries, and economy.

Inequality in earnings is greater when:

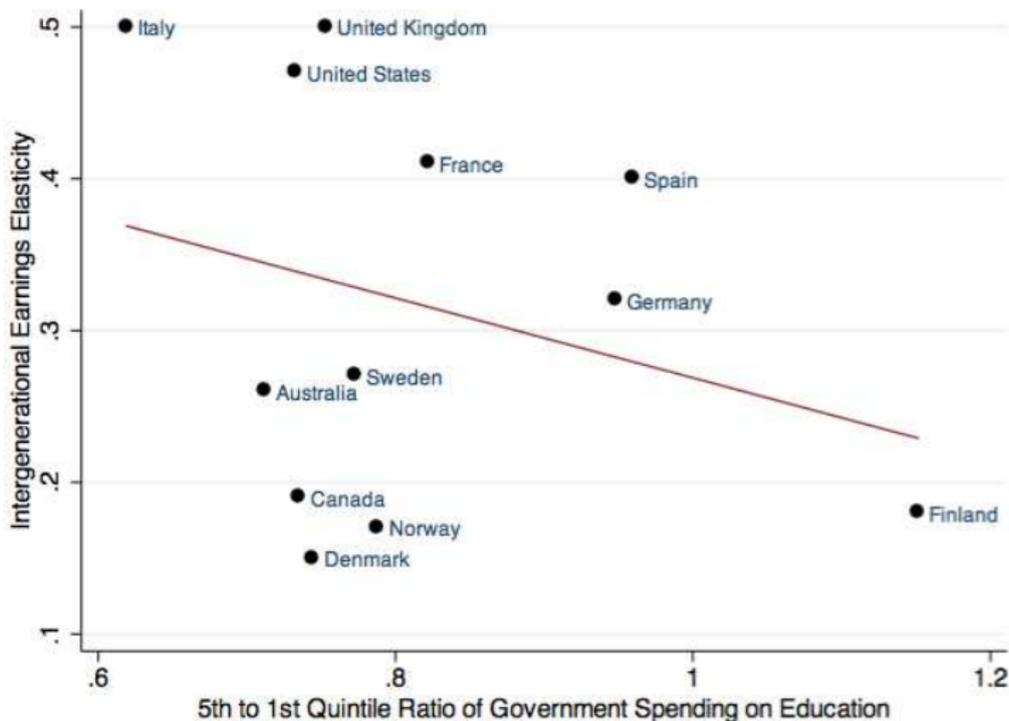
- 1  $r$  - return to education and other human capital - is greater.
- 2  $\sigma_H$  - inequality in human capital - is greater.
- 3  $\sigma_u$  - variance in shocks to earnings - is greater.

# The Great Gatsby Curve



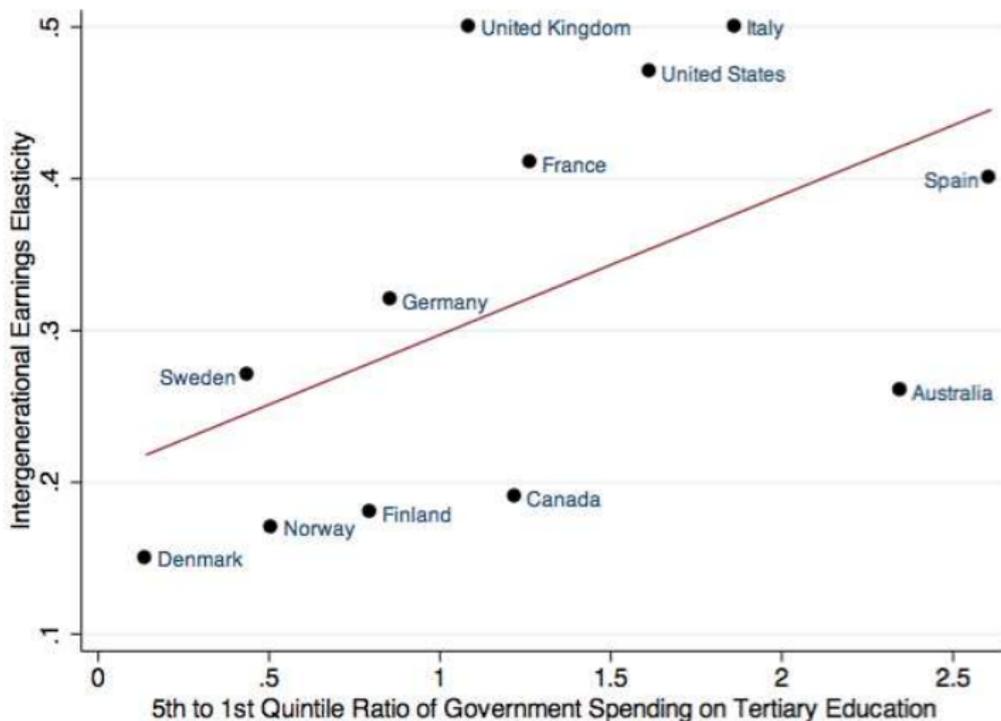
# Government Spending

More Spending on Rich, Lower Elasticity



# Government Spending

More Spending on Tertiary, Higher Elasticity



# Variance of Human Capital

Higher  $h$  implies greater  $\sigma_H^2$ .

- Simple inequality relation:  $\sigma_H^2 = \frac{\sigma_v^2}{1-h^2}$ .

What about converse?

- Does greater  $r$  imply greater  $h$  or  $c$ ? That is does it imply lower intergenerational mobility?
- If  $r$  is greater, so that parents with 10% higher earnings than median now have 20% higher, does that mean their children's earnings are from say 7% above their median to more than 14% above?